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EXAMINER
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LEUNG, JENNIFER A

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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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*Ex parte* MARK PHILIP D'EVELYN, KRISTI JEAN NARANG,  
ROBERT ARTHUR GIDDINGS,  
ROBERT VINCENT LEONELLI, JR.,  
and STEPHEN LEE DOLE

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Appeal 2008-0253  
Application 09/683,658  
Technology Center 1700

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Decided: February 15, 2008

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Before CHUNG K. PAK, THOMAS A. WALTZ, and  
CATHERINE Q. TIMM, *Administrative Patent Judges*.

WALTZ, *Administrative Patent Judge*.

DECISION ON APPEAL

This is a decision on an appeal under 35 U.S.C. § 134 from the Primary Examiner's final rejection of claims 104-106, 112, 130, and 145-155, which are the only claims pending in this application. We have jurisdiction pursuant to 35 U.S.C. § 6(b).

According to Appellants, the invention is directed to an apparatus that includes a capsule, a restraint, and an energy source, where the capsule has an interior surface defining a volume, can receive a material and a fluid, and is sealable and maintains the seal while subject to determined temperatures and pressures (Br. 2-3).<sup>1</sup> The restraint has an interior surface defining a chamber, this chamber is capable of receiving the capsule, and the restraint resists a pressure exerted by the capsule against the restraint interior surface to maintain the chamber at a substantially constant volume (Br. 3). The energy source supplies sufficient thermal energy to the capsule to achieve a determined temperature of at least about 800 °C (*id.*). Independent claim 104 is illustrative of the invention and a copy of this claim is reproduced below:

104. An apparatus, comprising:

a capsule having an interior surface defining a volume, and the capsule is configured to receive a material and a fluid in the capsule, the capsule both is sealable, and is operable to maintain a seal while the capsule is subject to a determined temperature and to a determined pressure, and the fluid is operable to become supercritical at least at the determined temperature and the determined pressure;

a restraint having an interior surface defining a chamber, and the chamber is configured to receive the capsule, and the restraint is responsive to resist a pressure exerted by the capsule against the restraint interior surface and to maintain the chamber at a substantially constant volume; and

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<sup>1</sup> We refer to and cite from the amended “**APPEAL BRIEF**” dated Dec. 18, 2006.

an energy source operable to supply sufficient thermal energy to the capsule so that the determined temperature is at least about 800 degrees Celsius, wherein the fluid is responsive to the thermal energy both to become supercritical at the determined temperature and at the substantially constant volume in the chamber, and to increase the pressure in the volume to at least the determined pressure.

The Examiner has relied on the following references as evidence of unpatentability:

Hall	US 2,947,610	Aug. 2, 1960
Wilson	US 3,473,935	Oct. 21, 1969
Flanigen	US 3,567,643	Mar. 2, 1971

#### ISSUES ON APPEAL

Claims 104, 105, 112, 130, 145, and 154 stand rejected under 35 U.S.C. § 102(b) as anticipated by Wilson (Ans. 3).

Claim 106 stands rejected under 35 U.S.C. § 103(a) as obvious over Wilson in view of Hall (Ans. 5). Claims 146-153 and 155 stand rejected under 35 U.S.C. § 103(a) as obvious over Wilson in view of Flanigen (Ans. 6).<sup>2</sup>

Appellants contend that the Examiner has ignored the functional limitation “to maintain the chamber at about a constant volume” since Wilson discloses an open core 16 that can’t control the volume (Br. 5). Appellants also contend that “supercritical fluid” may not be a positive element recitation in claim 104 but it does “qualify as functional language” and thus carries patentable weight (Br. 5-6).

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<sup>2</sup> The rejection of claims 150-152 under 35 U.S.C. § 112, ¶2, has been withdrawn by the Examiner (Ans. 2-3, ¶(6)).

Appellants contend that actively imposing pressure differs from providing a counterbalancing pressure required by claim 105 (Br. 6). Appellants further contend that the claim limitation “pressure response” indicates where pressure originates and thus is a legitimate element of the claimed apparatus (Br. 7).

Appellants contend that Wilson deems a temperature sensor unnecessary and Hall does not disclose the other elements of the claimed invention (Br. 8).

Appellants contend that Flanigen discloses a seal designed for use at low pressures and it is not reasonable for one of ordinary skill in the art to use this seal in a high pressure environment (Br. 8-9).

The Examiner contends that recitations of compositions to be crystallized or material to be worked upon have not been given patentable weight, and Appellants have not shown any difference in structure between their subject matter and the apparatus of Wilson (Ans. 8-11). The Examiner further contends that the intended use of the apparatus must result in a structural difference for it to be given patentable weight (Ans. 11 and 14).

The Examiner contends that Hall is evidence of the well known benefits of using a temperature sensor (Ans. 17). The Examiner further contends that Flanigen was merely relied upon as evidence that the use of reactants such as aluminum metal and ammonia for synthesizing known beryl derivatives was conventional in the art (Ans. 19).

Accordingly, we determine the issues presented from the record in this appeal are: (1) Have Appellants established that the Examiner reversibly

erred in construing the claims to “read on” the apparatus disclosed by Wilson; (2) Have Appellants established that the Examiner reversibly erred in the belief that the structure of Wilson is capable of performing all claimed functions; and (3) Have Appellants established that the Examiner reversibly erred in combining the conventional elements taught by Hall or Flanigen with the apparatus disclosed by Wilson?

We determine that the Examiner has properly established a prima facie case of anticipation and obviousness, which prima facie case has not been adequately rebutted by Appellants’ arguments. Therefore, we AFFIRM all grounds of rejection presented in this appeal essentially for the reasons stated in the Answer, as well as those reasons set forth below.

#### OPINION

##### A. The Rejection under § 102(b)

We determine the following factual findings (FF) from the record in this appeal:

- (1) Wilson discloses an apparatus comprising a capsule having an interior surface defining a volume (closed and sealed capsule 31, defining a chamber), where the capsule is capable of receiving a material and a fluid in the capsule volume (material 29 and water), a restraint (core 16) having an interior surface defining a chamber receiving capsule 31, and an energy source operable to supply thermal energy to capsule 31 (heating element comprising a carbon cylinder 33 proximate to the capsule 31, and a wattage control

system comprising conductors 39 and 40 electrically coupled to heating element 33) (Ans. 3-4; Wilson, Figs. 1 and 2; col. 2, ll. 61-69; col. 3, ll. 8-63);

- (2) Wilson teaches that the apparatus is configured to obtain pressures of up to 60,000 atmospheres and temperatures of up to about 2000 °C (Ans. 4; Wilson, col. 3, ll. 44-45; col. 4, ll. 5-10).

Under 35 U.S.C. § 102, every limitation of a claim must identically appear, either expressly or inherently, in a single prior art reference for it to anticipate the claim. *See In re King*, 801 F.2d 1324, 1326 (Fed. Cir. 1986). Implicit in our review of the Examiner's anticipation analysis is that the claim must first have been correctly construed to define the scope and meaning of each contested limitation. *See Gechter v. Davidson*, 116 F.3d 1454, 1457 (Fed. Cir. 1997). A patent applicant is free to recite features of an apparatus either structurally or functionally. *See In re Swinehart*, 439 F.2d 210, 212 (CCPA 1971). Yet, choosing to define an element functionally carries with it a risk. *See In re Schreiber*, 128 F.3d 1473, 1477, quoting *In re Swinehart*, 439 F.2d at 213:

[W]here the Patent Office has reason to believe that a functional limitation asserted to be critical for establishing novelty in the claimed subject matter may, in fact, be an inherent characteristic of the prior art, it possesses the authority to require the applicant to prove that the subject matter shown to be in the prior art does not possess the characteristic relied on.

Accordingly, we first construe the claims to define the scope and meaning of each contested limitation.<sup>3</sup> Appellants contend that “supercritical fluid” qualifies as functional language in claim 104, and thus should be given patentable weight (Br. 5-6). Giving the claim language its broadest reasonable interpretation consistent with the Specification, we agree with Appellants that the apparatus recited in claim 104 on appeal must be *capable* of withstanding a pressure, with an energy source *capable* of supplying sufficient thermal energy, to generate conditions such that some fluid in the capsule achieves a supercritical state. With respect to claim 105, we also construe this claim to mean that the restraint is *capable of* (or “operable”) to counterbalance pressure in the capsule and remain immobile. Similarly, with regard to claim 130, we do not limit the claim to any pressure response values but merely construe the claim to mean that the restraint is *capable* (or “operable”) of operating at these values. With regard to claim 145, we construe the pressure limitation “of greater than about 60 kbar” as including values greater than 60 kbar and also values slightly below 60 kbar. *See In re Woodruff*, 919 F.2d 1575, 1578 (Fed. Cir. 1990) (Concentration of “about 1-5%” does allow for concentrations slightly above 5%).

Applying the preceding legal principles to the factual findings in the record of this appeal, and in view of our claim construction as discussed

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<sup>3</sup> We determine that Appellants specifically present arguments for the separate patentability of only claims 104, 105, 130, and 145 (Br. 5-7). Accordingly, we limit our consideration to these claims.



above, we determine that the Examiner has established a prima facie case of anticipation in view of Wilson which has not been adequately rebutted by Appellants' arguments. We note that no evidence has been submitted by Appellants in response to this rejection.

As shown by FF (1) listed above, we determine that Wilson discloses the three elements of the apparatus as recited in claim 104 on appeal, namely a capsule, a restraint, and an energy source. Appellants argue that the core 16 taught by Wilson is not bounded on at least two sides, and thus has no three-dimensional control "to maintain the chamber at a substantially constant volume" as required by the restraint in claim 104 (Br. 5). However, we agree with the Examiner that during operation the core 16 of Wilson is closed by the pistons 23 and 24, thus maintaining "three-dimensional" control of the chamber volume (Ans. 10; Wilson, col. 3, ll. 15-22). As correctly noted by the Examiner, the restraint system of Wilson appears structurally identical or substantially identical to Appellants' restraint system (Ans. 10-11).

Appellants also argue that "supercritical fluid" is functional language which has patentable weight (Br. 5-6). However, in view of our claim construction discussed above, we agree with the Examiner that the apparatus of Wilson is *capable* of generating conditions of temperature and pressure that would create a supercritical fluid, which is all that is required by the claim language (Ans. 4 and 11-12). *See* FF (2) listed above; *and In re Schreiber, supra*.

With regard to claim 105, Appellants argue that actively imposing pressure differs from providing a counterbalancing pressure (Br. 6). In view of our claim construction above and the identical or substantially identical restraint system taught by Wilson, we determine that Appellants have not provided any evidence or persuasive argument that the restraint system of Wilson would not be *capable* of operating according to the manner claimed (Ans. 4 and 13).

With regard to claim 130, we similarly determine that Appellants have not provided sufficient arguments or evidence that the restraint system taught by Wilson would not be *capable* of operating under the conditions set forth in this claim.

With regard to claim 145, we determine that the maximum pressures taught by Wilson fall within the range claimed (Ans. 15-16).

For the foregoing reasons and those set forth in the Answer, we affirm the rejection of claims 104, 105, 112, 130, 145, and 154 under § 102(b) over Wilson.

B. The Rejections based on § 103(a)

We determine the following additional factual findings (FF) from the record in this appeal:

- (3) the Examiner takes “Official Notice” that it was well known in the art to provide temperature sensors for an apparatus in order to monitor and/or control the process, as evidenced by Hall’s teaching that temperature in a reaction vessel is determined by conventional means of placing a

thermocouple in the reaction vessel (Ans. 6; Hall, col. 1, ll. 60-70; col. 7, ll. 17-59); and

- (4) Flanigen discloses the preparation of beryl analog single crystals using metals such as aluminum with ammonia, while teaching that this process may be operated in any well known hydrothermal apparatus (Ans. 7-8; Flanigen, col. 2, ll. 40-46; col. 4, ll. 4-69; col. 5, ll. 47-55).

Under 35 U.S.C. § 103, the factual inquiry into obviousness requires a determination of: (1) the scope and content of the prior art; (2) the differences between the claimed subject matter and the prior art; (3) the level of skill in the art; and (4) secondary considerations. *See Graham v. John Deere Co. of Kansas City*, 383 U.S. 1, 17-18 (1966). “[A]nalysis [of whether the subject matter of a claim is obvious] need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of inferences and creative steps that a person of ordinary skill in the art would employ.” *KSR Int’l Co. v. Teleflex, Inc.*, 127 S. Ct. 1727, 1740-41 (2007), *quoting In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006). When the claimed subject matter simply arranges old elements with each performing the same function it had been known to perform, and yields no more than one would expect from such an arrangement, the combination is obvious. *See KSR, supra*.

Applying the preceding legal principles to all of the factual findings in the record of this appeal, we determine that the Examiner has established a *prima facie* case of obviousness which has not been adequately rebutted by

Appellants' arguments. As correctly construed by the Examiner, claim recitations of the material to be disposed into the capsule have no patentable distinction in claims drawn to an apparatus (Ans. 8-9; *see, e.g.*, claims 146, 147, and 150-152). Claim language as to *capability* of the apparatus to achieve certain temperatures and pressures must be considered in determining patentability (*e.g., see* claims 148 and 149). However, as discussed above, Appellants have not shown or explained why the identical or substantially identical apparatus taught by Wilson would not be capable of achieving sufficient temperatures and pressures to form aluminum nitride, especially in view of FF (2) listed above. As shown by FF (3) listed above, we determine that addition of a conventional temperature sensor means to the apparatus of Wilson would have been well within the ordinary skill in this art, as the artisan would have desired some method of monitoring the temperature of any crystal formation. *See* Hall, col. 1, ll. 57-71, and col. 7, ll. 17-26, where similar reaction temperatures are measured by "conventional means" such as a thermocouple. *See also* Flanigen, directed to formation of single crystals of beryl analogs as is Wilson, with the teaching that knowledge of the temperature is necessary (Flanigen, col. 7, ll. 13-28).

With regard to the rejection including Flanigen, we determine, as discussed above, that the recitation in the claims as to material disposed in the capsule does not distinguish the claimed apparatus from the apparatus disclosed by Wilson (Ans. 8-9). Even assuming that these recitations were construed as limitations, we agree with the Examiner that Flanigen teaches

the use of aluminum and ammonia in the formation of beryl single crystals, while also teaching that conventional hydrothermal reaction vessels, autoclaves, or bombs such as those taught by Wilson, are well known in the art (*see* FF (4) listed above). Since Wilson is also directed to the formation of single crystals of beryl and derivatives (col. 1, l. 67-col. 2, l. 8), we determine that the use of the materials taught by Flanigen in the apparatus of Wilson would have been well within the ordinary skill in this art.

For the foregoing reasons and those stated in the Answer, we affirm all rejections based on § 103(a) presented in this appeal.

C. Summary

The rejection of claims 104, 105, 112, 130, 145, and 154 under § 102(b) over Wilson is affirmed.

The rejection of claim 106 under § 103(a) over Wilson in view of Hall is affirmed. The rejection of claims 146-153 and 155 under § 103(a) over Wilson in view of Flanigen is affirmed.

The decision of the Examiner is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED

Appeal 09/683,658  
Application 2008-0253

PL initials:  
sld

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